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In the vicinity of Macksburg, north of Marietta, the light south-eastward dip of the strata is found to be interrupted, and for nearly a mile a terrace-like structure prevails. This is masked, it is true, by the immense erosion which the country has suffered, and only comes into view when the best-known elements of the exposed section as coal-seams are followed by means of the level. All of the strata ever reached by the drill, as well as all that are above the surface, are equally affected by this structural irregularity.

But this terrace is an oil-field, and has been for twenty years. Oil was first found here in shallow wells, from two hundred to three hundred feet deep in the upper Mahoning sandstone. But adventurous drillers, one after another, struck new sources of oil. A second oil-sand, and a third, were discovered at five hundred and seven hundred feet respectively. Finally the drill was sunk deeper still, until, at thirteen hundred feet, the Berea grit was found, holding a stock of oil large enough to make the Macksburg field for the first time a factor in the general market. It has produced as many as three thousand barrels per day since then, and is now yielding twenty-five hundred barrels per day.

But the shallow and the deep productive wells are alike definitely limited to the terrace that has been described. In other words, four oil-sandstones become productive in the same area when the structure is found favorable. That they do not communicate with each other is evident from the fact that the oils which they severally contain differ from each other in gravity, in color, and in chemical constitution.

The depth of the Berea grit below sea-level in the terrace is 735 feet. Of twenty-four wells, occupying four square miles in this field, sixteen reach the Berea between 733 and 737 feet, and six are found by their records to be exactly 735 feet.

On the north-western margin of the terrace, at elevations of 728, 720, 713, and 704 feet, gas is found, but no oil. After many hundred wells have been drilled on all sides, the terrace which has been revealed by the engineer's level is alone found productive.

The grain of the sandstone is in every way as promising, and its thickness as great, outside of the field as within it; and the sections both above and a thousand feet below the Berea grit appear identical in productive and in barren territory alike. It is hard to resist the conclusion that the Macksburg oil-field is dependent upon the structural irregularity here described, the other elements, of course, being presupposed.

May not a like explanation be applied to the oil and gas fields of Pennsylvania and New York as

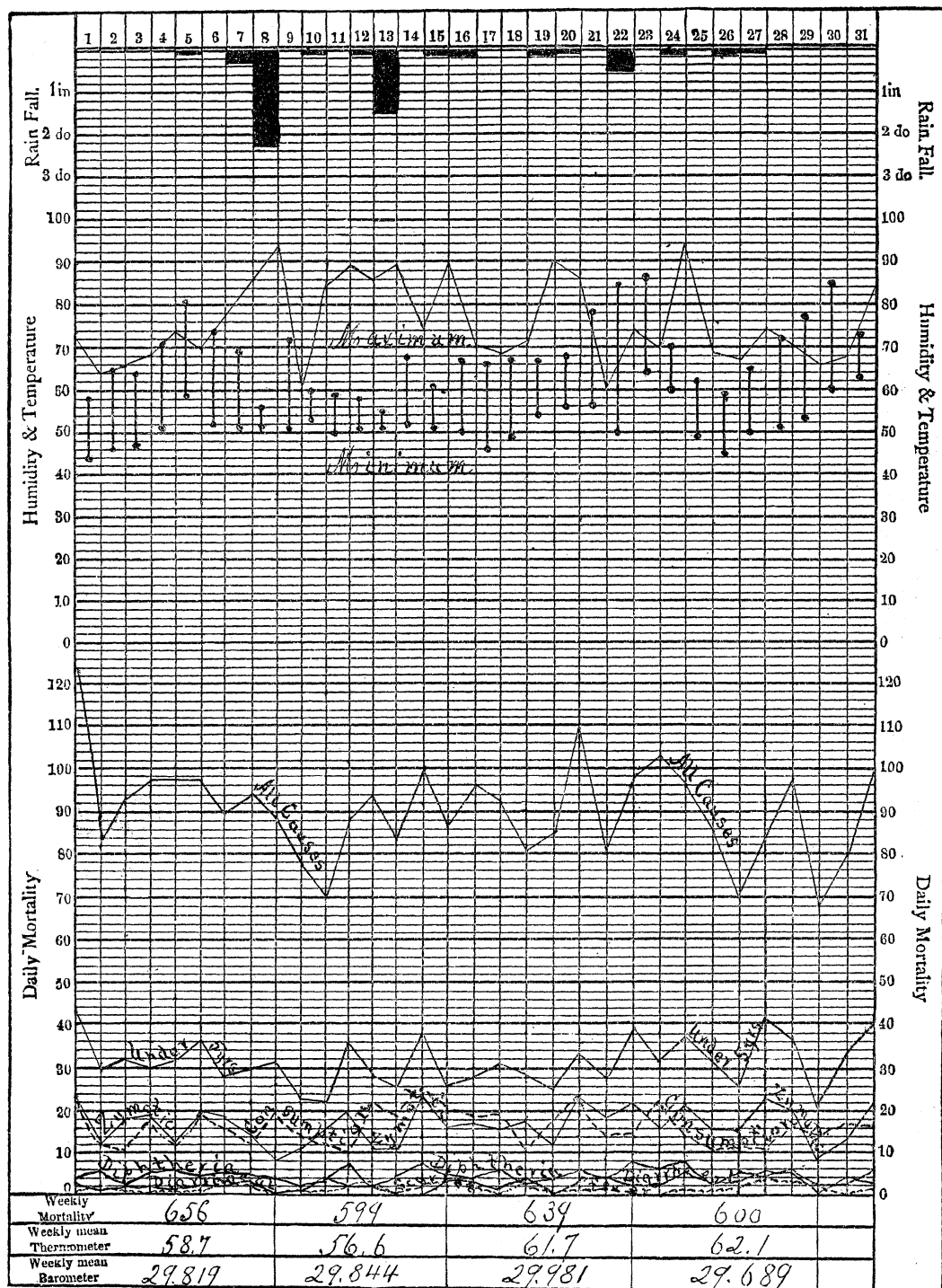
well? Is it not possible that their productive areas are also dependent on structural disturbance, slight though it may be? These areas have been sometimes explained as resulting mainly from the coarseness of grain of the oil-sands. Lenticular deposits of gravel have been suggested, arranged in north-east and south-west lines for the several petroliferous horizons. It is hard to see how any one of these long tongues of gravel could be accounted for, laid down so far from the shore of the sea in which it was deposited. It is much harder to understand how, as the geological ages went by, one after another of these peculiar deposits should be laid down on these self-same lines. It is certainly much easier to conceive of the oil-sands as wide-spread sheets of sand and gravel, that become the reservoirs of oil and gas when lifted into elementary folds. This is certainly true of the Berea grit in Ohio, and this great stratum, it is now definitely settled, constitutes one of the main oil-sands of Pennsylvania. Under this view, the arrangement of the several oil-fields in north-east and south-west lines becomes easily intelligible. These oil-fields are simply conforming to, as they are determined by, the main structure-lines of western Pennsylvania.

EDWARD ORTON.

THE HEALTH OF NEW YORK DURING MAY.

THE population of the city of New York on May 1 was estimated at 1,432,094. Assuming the normal increase to be 799 each week, there would be, June 1, a population of about 1,435,290. Of this number, 2,759 died during the month of May, a mortality less by 206 than occurred during the preceding month. Of children under five years of age, there was a saving of 110 lives as compared with April. The greatest mortality from all causes which occurred during any one day was on the 20th, when 107 persons died. Of this number, 24 were children under one year of age, 29 under two years, and 34 under five years. Consumption caused more deaths on that day, as indeed it usually does on most days of the year, than any other single disease, its victims being 24. The deaths during the month from diarrhoeal diseases were 73, an increase of 16 over the month of April. Diphtheria also caused a considerable increase, its deaths being 165 against 124. Scarlet-fever maintained the same position among the mortality-factors which it had occupied for the two preceding months: the deaths from this disease in March were 42; in April, 49; and in May, 44.

It will be remembered that while rain fell on



but few days in the month of April, only seven, yet the aggregate rainfall was about the average for the same month in preceding years. May was in all respects a month of showers: on fourteen of its days rain fell to a greater or less amount; and the total for the month was 5.40 inches. During the same month in 1885, although some rain fell on thirteen days of the thirty-one, but one less day than this year, yet the total rainfall for the month was but 1.86 inches. As will be seen by the chart, the greater part of the rain this year fell on the 8th and 13th insts. An examination of the records for the past seventeen years fails to show such a rainfall during May, the nearest approach being in the year 1882, when 4.20 inches fell. If, however, we continue our search still further back, we shall find a number of years in which this rainfall is surpassed, and in one year, 1846, nearly doubled, it being then 10.25 inches. The highest point reached by the thermometer was 86° F., on the 23d inst., at 5 P.M. On the preceding day the mercury rose to 84° F. at 4 P.M., and on the 30th it reached 85° F. at the same hour of the day.

A NEW EXPEDITION TO ALASKA.

THE New York *Times* has sent an exploring expedition to Alaska, the object of which is to explore the St. Elias range of mountains and the country between them and the sea, while an attempt will be made to ascend Mount St. Elias itself. The expedition is led by Lieut. Frederick Schwatka, who has already won deserved renown in arctic travel and research. In 1879 he led an expedition over the route of Sir John Franklin's party, and brought to the world its fullest and final knowledge of the fate of the *Erebus* and *Terror*. Again, in 1883, he explored from its source to its mouth Alaska's great river, the Yukon. It was in returning from this trip that Lieutenant Schwatka conceived the desire to visit the mountainous and forbidding southern coast of Alaska, and tell the world something of its Indian races, of its forests, its soil, and its glaciers. The *Times* has given him an opportunity to undertake this voyage of discovery and description, and it hopes in due time to lay before the public such additions to the world's present slight knowledge of this region as will amply justify the effort and the expense involved.

Lieutenant Schwatka himself has an article in a recent number of the *Times*, in which he says:—

"The New York *Times* Alaskan exploring expedition, which sailed on the Alaskan steamer *Ancon* from Port Townsend, Washington Territory, June 14, has for its object the exploration of

the almost wholly unknown St. Elias Alps, stretching for nearly 300 miles from the upper part of that picturesque lane of water called 'the inland passage to Alaska' to Mount St. Elias, the highest peak of the North American continent, and which throws its name over the whole range, and even beyond. The expedition, therefore, will have to do with mountain-climbing; and should opportunity present, which is very likely, attempts will be made to ascend, in whole or in part, some of the numerous peaks that project from that high range. Although, strictly speaking, this is not its main object, still it would be considered no small victory to crown the king of the American continent, Mount St. Elias, with shoe-leather of American make, and, but a little way behind this, to reach the summits of any of the others, — Crillon, Fairweather, La Perouse, Vancouver, Lituya, d'Agelet, — all higher than any peak short of the Rocky Mountain range. Should the top of the main range be gained, at 8,000 to 10,000 feet above sea-level, it is hoped — and the probabilities are great — that a bird's-eye view in the interior will compensate for all the trouble taken, and especially if this be done at several points along the main ridge. Bad weather, of course, could defeat much of this part of the plan, but during the summer months this is not very likely. The interior slopes may be descended if the prospect is at all flattering for important research and discovery of any kind; for toward the interior absolutely nothing is known of the country. Prof. William Libbey, jun., professor of physical geography in Princeton college, will have charge of the scientific work, and especially the hypsometrical and topographical part of it. He has been identified with considerable practical Alpine work in the past, both in our own and other countries. The well known hypsometrical and other scientific tables compiled by the late celebrated Professor Guyot (to whose chair at Princeton Professor Libbey succeeded on the former's death), and published by the Smithsonian institution at Washington, were recently revised under Professor Libbey's care, and brought up to the requirements of scientific advancement in that line since Professor Guyot's death. Many of the hypsometrical and other scientific instruments taken were once those of that celebrated geographer."

Of the scientific aims and prospects of the expedition, Lieutenant Schwatka writes as follows:—

"The glacier system of the Mount St. Elias Alps is undoubtedly the most extensive south of the arctic regions themselves. Just how extended it is cannot be told until further exploration gives more data. It will probably be many years before